



Setting Instream Flows in Washington State

Introduction

In Washington State we have opportunities to use and appreciate water in many ways, from supplying water for our homes, industry, irrigation and power generation to enjoyment of scenic beauty, recreational opportunities and providing habitat for fish and wildlife. Under state laws, the Washington Department of Ecology oversees both the appropriation of water for out-of-stream uses (e.g. irrigation, municipalities, commercial and industrial uses) and the protection of instream uses (e.g. water for fish habitat and recreational use). Ecology does this by adopting and enforcing regulations, as well as by providing assistance to citizens regarding both public and private water management issues. Protection of instream uses is closely interwoven with the management and protection of existing and future water rights.

What is instream flow?

As with many things, there is a difference between a general understanding of the term "instream flow" and the meaning it has in a legal and regulatory sense. One might assume the meaning to be the amount of water flowing in a stream, and this is partially true. However, the amount of instream flow, in this general sense, can fluctuate widely because it is influenced by many factors. These factors may include recent rainfall, snow or glacial melt, temperature, season, vegetative cover, characteristics of the soil and geology, and the amount of water moving through the soil (ground water) which feeds the stream. In the winter, flow may be very heavy and in summer almost non-existent; at narrow points of the channel the water may be fast moving but low in volume, whereas at a wide point in the stream the same volume of water may move slowly. For Ecology's purposes, this general meaning of a flow in a stream at

any given time is referred to as "stream flow."

Ecology uses another term to describe the flow that remains in the stream channel during extended periods without rainwater. This flow, which comes from ground water feeding or discharging to the stream, is called "**base flow.**" In much of the state, this base flow (or recharge) sustains late summer stream flows almost exclusively from ground water.

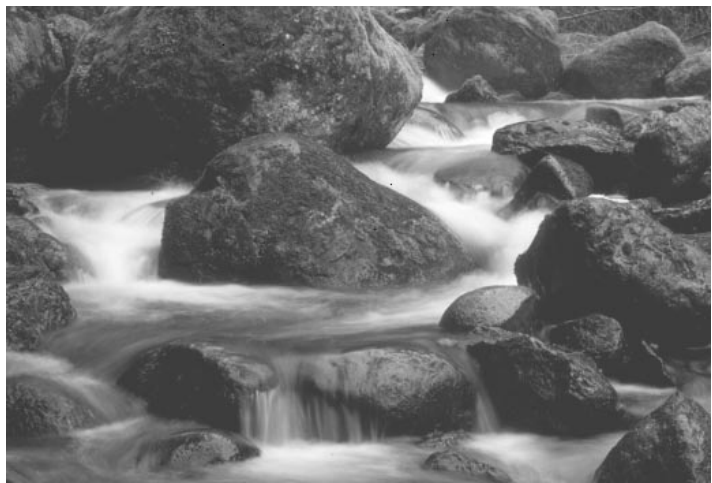
The legal and administrative meaning of "**instream flows**" is different from either base flow or stream flow, being more abstract. The volume of water required for an instream flow is developed by considering existing data, the hydrology of a stream and its natural variations in stream flow and base flow over the course of the year, studying the need for fish habitat, as well as many other factors.

Federal agencies use the term "target flow" referring to an amount of water in a stream to meet fish needs. Under the Endangered Species Act (ESA), the National Marine Fisheries Service and the US Fish and Wildlife Service use target flows as their goal to provide adequate flows for ESA-listed fish. A target flow is to be biologically-based, achievable, and would provide sufficient water for "properly functioning habitat".

Why are instream flows important?

With few exceptions, water appropriation reduces streamflow, whether water is taken by a direct diversion from a stream or from a well pumping some distance from a stream. At the most critical times of year, the amount of water necessary to preserve fish habitat and satisfy existing water rights sometimes equals or exceeds the amount of water naturally flowing in the stream, leaving little or nothing for additional water right appropriation. The period of highest demand by humans most often occurs at the same time of year when salmon species return to migrate upriver and spawn; this is when people use water for irrigation of lawns, gardens and commercial crops.

Ecology is required by law to protect instream flows by adopting regulations and to manage water uses that affect stream flows. Once adopted, an instream flow rule acquires a priority date similar to that associated with a water right. Water rights existing at the time an instream flow is adopted are unaffected by the rule and those issued after rule adoption are subject to the requirements of the instream flow rule. A "junior" water right would contain provisions requiring the diversion of water authorized by the water right to cease when the stream flow drops to the levels protected in the rule.



Statutory foundation of Washington's water code and instream flow program

Early water law in Washington State recognized out-of-stream uses of water as beneficial and therefore eligible to be awarded water rights. Washington's water law is based on the western United States' doctrine of prior appropriation, in which "first in time is first in right." Most uses of water taken from a stream or well require permission from the state in the form of a water right. Water rights are assigned priority dates, starting with the most senior, and when water shortages occur, junior users must stop diverting water to ensure that senior users can meet their needs.

In 1949 the legislature amended the state's fisheries code (*Chapter 75.20 RCW*) to tie water allocation to the needs of fish for water and to require consultation between the state agencies managing fish and water. This authority led Ecology's predecessors (and later, Ecology) to begin conditioning or denying water rights on streams when fish would be harmed if water was diverted at certain times, as described above.

In the 1960s and '70s the legislature recognized instream uses of water as beneficial and capable of being protected through administration of the water code and regulations.

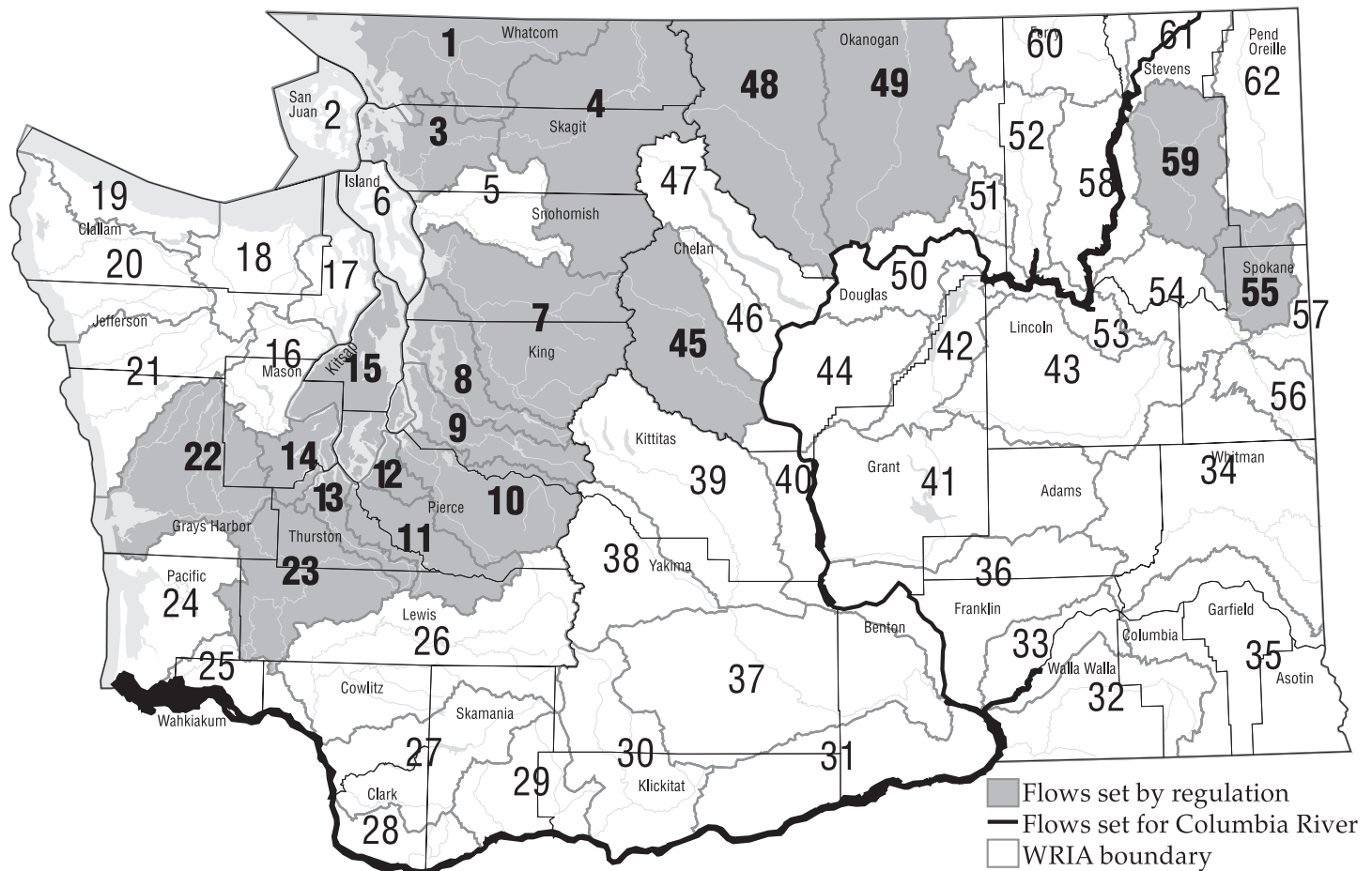
The 1967 Minimum Water Flows and Levels Act (*Chapter 90.22 RCW*) directed Ecology to adopt regulations to establish minimum flows (or levels), on streams and lakes to protect "fish, game, birds, and other wildlife, recreational or aesthetic values or to preserve water quality."

Finally, the Water Resources Act of 1971 (*Chapter 90.54 RCW*) requires Ecology to establish base flows to protect, and where possible enhance and preserve a variety of instream beneficial uses, such as fish, wildlife, navigation, recreation, aesthetics, and other environmental values.

Instream flow methodology

While everyone agrees fish need water to survive, not everyone agrees on how much. Fortunately, there are ways to answer the question scientifically. The method generally used by Ecology and the Washington Department of Fish and Wildlife is the "Instream Flow Incremental Methodology" (IFIM). IFIM refers to a series of computer-based models that show how changes in available habitat will result from increases or decreases in streamflow. These models can accurately predict the water depths and velocities (water movement) in a river during different seasonal flow events.

Water Resource Inventory Areas with Instream Flow and/or Closure Set by Regulation



IFIM was developed—and Ecology began using it—in the late 1970s. It is the most widely used and accepted method for evaluating instream needs for fish habitat. Many instream flows in the state were set by regulation using this method between 1976 and 1986. IFIM was used to set flows in the Skagit in 2001.

IFIM is based on the understanding that fish prefer water with a certain depth and velocity. Different species of fish have different preferences, and these preferences vary during each of their life stages. Flows for spawning are often critically important to salmon, so in analyzing IFIM results and fish needs, biologists might focus on recommending flows to protect spawning habitat. IFIM is used only for flowing waters; that is it is not used for lakes or reservoirs, or for predicting fish production. For more information on IFIM, please see the related publications listed below.

An instream flow recommendation is based primarily on the needs of fish, water quality, recreation and other instream resources and values. Setting an instream flow does not add more water to the stream, but ensures that future appropriations (i.e., new water rights) may not impair instream flows. An instream flow may be viewed as a goal for streams that need to have flows restored.

History and current status of Ecology's instream flow program

Following passage of the Water Resources Act in 1971, major watersheds of the state were divided into sixty-two "Water Resource Inventory Areas" (WRIAs). The WRIAs were the geographic basis of Ecology's Basin Management Programs and Instream Resource Protection Programs, which focused first in eastern Washington in the late 1970s, and in western Washington in the 1980s. Over time the scientific basis for instream flow recommendations improved, with better assessment of fish needs.

By 1986, Ecology had adopted eighteen basin plans or Instream Resources Protection Programs affecting 21 Water Resources Inventory Areas plus the mainstems of both the Snake and Columbia Rivers. Approximately 350 streams and lakes were also closed to further withdrawals of water. In addition, low flow provisions have been applied to individual water right permits or certificates on about 250 other streams.

The variety of terms used in statute and the science of hydrology, along with differences in interpretation, has led to much disagreement around instream flows. Conflict over a draft instream flow regulation proposed in 1986 for the Skokomish-Dosewallips WRIA led to a several-year legislatively mandated hiatus in the program. During this period, lengthy discussions and disputes have occurred among and between the legislature, the courts, the executive branch, Tribes, citizen groups and others with water interests.

No new instream flow regulations were adopted

until the Skagit in 2001.

Ecology continues to use IFIM study results to condition new water right permits on a case-by-case basis. Ecology has either completed or nearly completed IFIM studies in an additional 24 watersheds. IFIM studies by other agencies and consultants have been done in another 14 watersheds.

Setting an instream flow: *the process*

The process used to set an instream flow usually begins by consulting with other natural resource agencies and affected Tribes, to obtain their recommendations. These entities are invited to participate at every stage of instream flow development: participating in studies, providing data, making recommendations, and reviewing proposed regulations and draft reports.

Based on these recommendations and discussions, and Ecology's own analysis of supporting data, Ecology will propose a draft instream flow regulation. This draft regulation is then distributed for public and agency review and comment. In many cases, Ecology conducts public workshops to discuss proposals. In all cases, Ecology holds public hearings to invite official public testimony on the proposed regulations. Based on the comments received during the public comment period, Ecology either adopts the regulation, or revises it and then repeats the public review process, if necessary, before reconsidering the proposal for adoption.

Future direction with watershed planning and flows

The 1998 Legislature passed the Watershed Planning Act (Chapter 90.82 RCW) authorizing local government entities, the state and local governments, affected Tribes, public water purveyors, and other stakeholders within each Water Resource Inventory Area to evaluate water quantity issues and make plans to meet future needs. These watershed planning units are also authorized to analyze water quality and fish habitat issues, and can propose instream flows as part of a comprehensive watershed management plan, if they choose to do so. However, the planning unit can only modify existing instream flows if there is unanimous agreement of all group members. If the planning unit wishes to establish instream flows, the flows must be recommended to Ecology within four years of the date the planning group receives funds under the Watershed Planning Act. The instream flows will actually be adopted through Ecology's rule adoption process. If the planning unit tries to establish instream flows but does not reach agreement, the law directs Ecology, in consultation with affected Tribes, to develop and adopt instream flows for the watershed.

Under the Watershed Planning Act, local planning units need to identify strategies to make existing water supplies go as far as possible to meet the needs of both humans and aquatic life. The new law especially emphasizes getting more water back into streams where and when

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Future direction

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the needs are most critical to fish. It is up to the members of the planning unit to reach agreement on how best to protect and restore stream flows, while also making water available for use by people.

If you have technical or scientific questions about setting instream flows, contact

❖ **Brad Caldwell**,
Department of
Ecology, (360) 407-6639,
brca461@ecy.wa.gov, or

❖ **Dr. Hal Beecher**,
Washington Department of Fish and Wildlife, (360) 902-2421,
BEECHHAB@dfw.wa.gov

❖ For policy questions, call **Doug Rushton**, (360) 407-6513,
drus461@ecy.wa.gov

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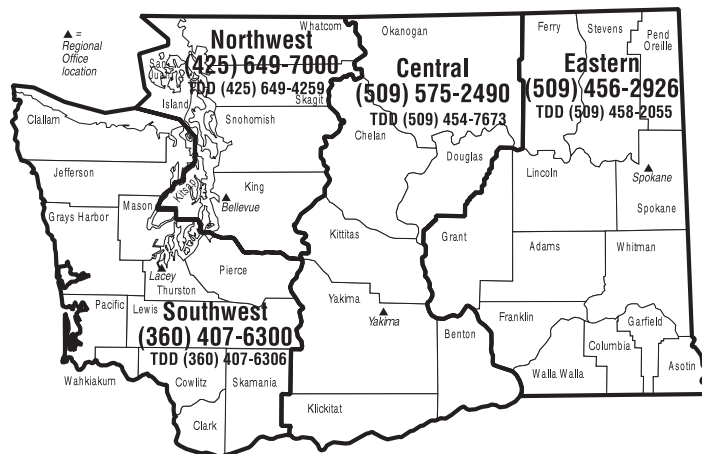
Flows in the future

By 2010, it is expected that 6.5 million Washington citizens will be competing for water, along with the fish and other natural users of our water resource systems. Ecology believes that where instream flows are sufficient, these flows must be set by regulation and protected. Real progress must be made through local watershed planning, assisted by state and federal governments to restore flows that are inadequate to protect endangered fish.

To meet this challenge, future water resource management must sustain both local communities and the natural systems on which we all rely. The system

must protect existing rights, provide timely and predictable supplies, and ensure clear accountability for all parties. To this end, Ecology has introduced the evolving concept of a **natural resource base**. The natural resource base would include sufficient water to protect and restore healthy fish and aquatic life, as well as adequate water for other needs. Local watershed planning groups would define the natural resource base for their watershed. As watershed planning groups start to address flows, the lessons they learn will be incorporated into Ecology's approach.

Ecology's Regional Offices



For more information

For more information, contact a Department of Ecology Regional Office near you.

Additional information on subjects mentioned in this document can be obtained at the following websites:

❖ **Watershed Planning:**
<http://www.ecy.wa.gov/watershed/index.html>

❖ **Water Resources**
(Water Resources vision, flow setting, natural resource base, etc.):
<http://www.ecy.wa.gov/programs/wr/wrhome.html>

❖ **Statewide Strategy to Recover Salmon: Extinction is Not an Option.**
(Governor's Salmon Plan):
<http://www.governor.wa.gov/esa/>

❖ **National Marine Fisheries Service (Pacific Northwest Region):**
<http://www.nwr.noaa.gov/>

❖ **Related publication:**
Q&A: "An Overview of the Instream Flow Incremental Methodology," publication number Q-WR-95-104 available at Ecology's Publication Office; call (360) 407-6607, or online at: <http://www.ecy.wa.gov>

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Washington State
Department of Ecology
P.O. Box 47600
Olympia, Washington
98504-7600